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# Tropical Pacific sea surface salinity variability derived from SMOS data: Comparison with in-situ observations.

Joaquim Ballabrera, Nina Hoareau, Marta Umbert, Justino Martínez, and Antonio Turiel
Institut de Ciències del Mar / CSIC, Barcelona (joaquim@icm.csic.es, +34 93 2309555)

Prediction of El Niño/Southern Oscillation (ENSO), and its relation with global climate anomalies, continues to be an important research effort in short-term climate forecasting. This task has become even more challenging as researchers are becoming more and more convinced that there is not a single archetypical El Niño (or La Niña) pattern, but several. During some events (called now Standard or East Pacific), the largest temperature anomalies are located at the eastern part of the Pacific. However, during some of the most recent events, the largest anomalies are restricted to the central part of the Pacific Ocean, and are now called Central Pacific or Modoki (a Japanese word for “almost”) events.

Although the role of salinity in operational ENSO forecasting was initially neglected (in contrast with temperature, sea level, or surface winds), recent studies have shown that salinity does play a role in the preconditioning of ENSO. Moreover, some researchers suggest that sea surface salinity might play a role (through the modulation of the western Pacific barrier layer) to favor the Standard or the Modoki nature of each event.

Sea Surface Salinity maps are being operationally generated from microwave (L-band, 1.4 Ghz) brightness temperature maps. The L-band frequency was chosen because is the optimal one for ocean salinity measurements. However, after three years of satellite data, it has been found that noise in brightness temperatures (due to natural and artificial sources) is larger than expected. Moreover, the retrieval of SSS information requires special care because of the low sensitivity of the brightness temperature to SSS: from 0.2-0.8 K per salinity unit. Despite of all these facts, current accuracy of SS maps ranges from 0.2-0.4, depending on the processing level and the region being considered.

We present here our study about the salinity variability in the tropical Pacific Ocean from the 9-day, 0.25 bins salinity maps derived from the SMOS reprocessing campaign released to the SMOS user community on March 2011. During the period under study, the equatorial Pacific has been in a quasi-continuous La Niña state. During the cold phases of ENSO, positive anomalies of SSS are expected with the largest anomalous values in the western warm-fresh pool. The anomalies derived from the SMOS data do indeed display a positive anomaly. The persistence of the feature, its geographical pattern, the time modulation of the anomaly amplitude indicate, and its resemblance with in situ observations indicate this novel observation technology is currently able to capture seasonal and interannual signatures of climate interest.